Small Business Innovation Research/Small Business Tech Transfer

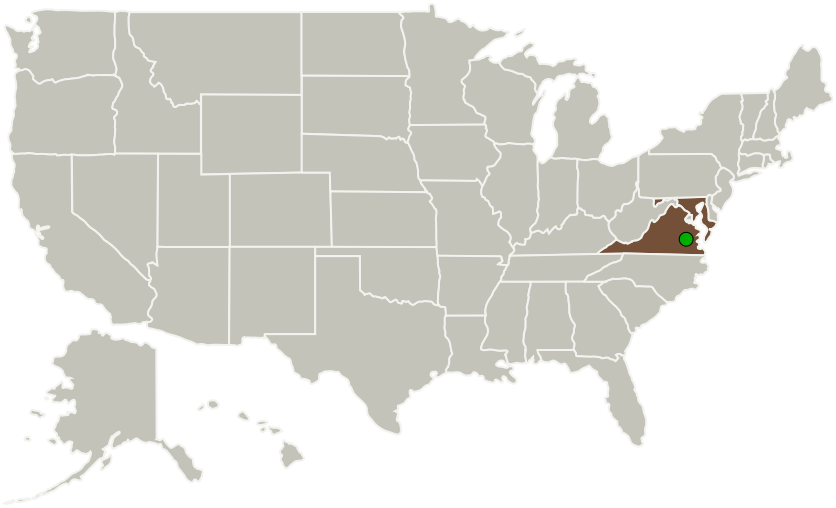
An Advanced Ultrasonic Imaging System using Time-Reversal MUSIC Technique for Rapid Inspection of Ultra Large, Complex Composite Structures, Phase I

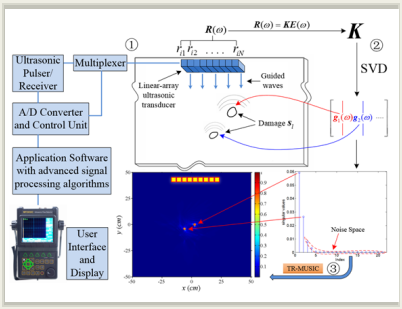
Completed Technology Project (2015 - 2015)

Project Introduction

NASA seeks advanced Nondestructive Evaluation (NDE) sensor systems with advanced processing and displays to provide reliable assessments of the location and severity for large, complex structures. The use of composites in aircraft manufacturing is growing dramatically. The assessment of structural integrity of composite materials after automated manufacturing becomes vitally important for the safety of the aircraft and its crew members. Conventional NDE methods, e.g., ultrasonic C-scan and tap test, use point-by-point scan scheme, which is labor intensive and time consuming. New NDE sensor systems that can quickly scan defects in large, complex composite structures are highly desirable.To address this critical need, X-wave Innovations, Inc. (XII), teaming up with Prof. Fuh-Gwo Yuan at North Carolina State University (NCSU) proposes to develop an innovative Automated Ultrasonic Imaging Technique system, which is called AUIT system, for rapid inspection of large-area complex composites. In Phase I we will prototype an AUIT system and demonstrate the feasibility of the proposed technique. In Phase II, we will focus on refining the prototype system design and development with improved hardware and software. In Phase III, we will focus on transitioning the AUIT technology.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
X-wave Innovations	Lead Organization	Industry Women-Owned Small Business (WOSB)	Gaithersburg, Maryland
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Maryland	Virginia

Project Transitions

June 2015: Project Start

December 2015: Closed out

Closeout Summary: An Advanced Ultrasonic Imaging System using Time-Reversal MUSIC Technique for Rapid Inspection of Ultra Large, Complex Composite Structures, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/138813)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

X-wave Innovations

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

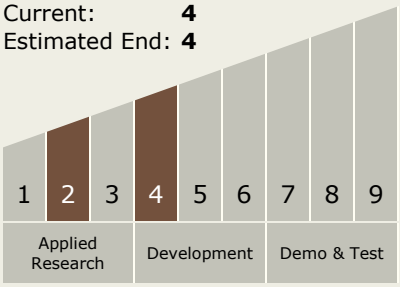
Carlos Torrez

Principal Investigator:

Carlos Rentel

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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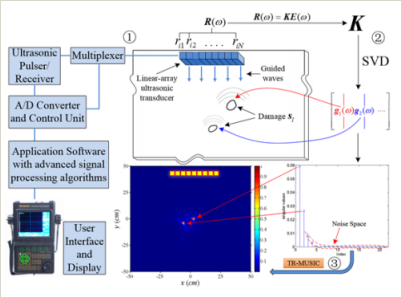
Images



Briefing Chart Image
An Advanced Ultrasonic Imaging System using Time-Reversal MUSIC Technique for Rapid Inspection of Ultra Large, Complex Composite Structures, Phase I
(https://techport.nasa.gov/image/134865)

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System